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10/076,727	02/13/2002	John T. Groves	IB-1695	2093

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EXAMINER	
STEELE, AMBER D	

ART UNIT	PAPER NUMBER
1639	

MAIL DATE	DELIVERY MODE
08/10/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/076,727	GROVES ET AL.	
	Examiner	Art Unit	
	AMBER D. STEELE	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *June 1, 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-20 and 25-27* is/are pending in the application.

4a) Of the above claim(s) *13,19,25 and 27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-12, 14-18, 20 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Claims 1-24 were originally filed on February 13, 2002.

The amendment to the claims received on November 24, 2004 changed the status identifiers only.

The amendment to the claims received on May 26, 2005 amended claims 13, 14, and 16.

The amendment to the claims received on February 3, 2006 canceled claims 1-6 and 21-24, amended claims 1-9, 14, and 17, and added new claims 25-26.

The amendment to the claims received on September 27, 2006 amended claims 7-9, 14, and 25-26.

The amendment to the claims received on February 23, 2007 amended claims 25-26.

The amendment to the claims received on August 10, 2007 amended claims 7, 8, and 14.

The amendment to the claims received on May 5, 2008 amended claims 7-9, 13-14, and 25 and added new claim 27.

The amendment to the claims received on June 1, 2009 amended claim 7 and 15.

Please note: a Notice of Non-compliant Amendment was mailed on April 1, 2009. However, applicants failed to correct all errors cited in the Notice. In order to be considered compliant and fully responsive to the present Office action, applicants must correct the status identifiers for present claims 13, 19, 25, and 27 (withdrawn).

Claims 7-20 and 25-27 are currently pending.

Claims 7-12, 14-18, 20, and 26 are currently under consideration.

Election/Restrictions

2. Applicants elected, without traverse, the species of major histocompatibility complex as a final species of dopant molecules in the reply filed on February 23, 2007. Claims 13, 19, 25 and 27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Priority

3. The present application (10/076,727; filed February 13, 2002) claims the benefit of 60/269,625 filed February 16, 2001 and 60/296,952 filed June 8, 2001.

Withdrawn Rejections

4. The rejection of claims 7 and 15-20 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is withdrawn in view of the claim amendments received on June 1, 2009.

Maintained Rejections

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 7-12, 14-18, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boxer, Current Opinions in Chemical Biology, Dec. 2000, Vol. 4, pp. 704-709 in view of

Cremer et al., J. Am. Chem. Soc., Aug. 1999, Vol. 121, pp. 8130-8131, (IDS filed 5/15/02) and Grakoui et al., Science, Jul. 1999, Vol. 285, pp. 221-227, (IDS filed 5/15/02).

For present claims 7-12, 14-18, 20, and 26, Boxer teaches (please refer to the entire publication particularly the abstract and p. 706) contacting living cells with supported lipid bilayer membranes, wherein the lipid bilayer membranes comprise cell recognition components, and including supported membranes decorated with receptor protein, reading on a dopant that is a membrane protein. In addition, Boxer teaches (see p. 708) functional membranes proteins and (p. 704, para 3) the lipid bilayer of supported membranes is separated from the solid support by a thin layer of water. Furthermore, Boxer teaches fibronectin grids utilized to corral supported membranes and pre-patterned barriers (i.e. adjacent membrane corrals; see Figures 2 and 4).

To further support the use of adjacent membrane corrals taught by Boxer, please refer to Cremer et al. which is reference number 38 in Boxer. Cremer et al. (please refer to the entire publication particularly p. 8130) teach that the use of planar supports for presenting large arrays of spatially addressed molecules is one of the most powerful and versatile methods for creating combinatorial libraries for use in rapid screening assays. In addition, Cremer et al. (see p. 8130) teach expanding this approach to supported phospholipid bilayer membranes containing peptides, receptors and integral membrane proteins in order to mimic cell surface properties. Cremer et al. also (see p. 8130, para 3, Fig. 2) teach a 3 X 3 array of glass well plates, reading on the "corrals" of the instant claims, which contain addressed egg phosphatidylcholine lipid membranes with various dyes. Furthermore, Cremer et al., (see p. 8131, Fig. 3) teach selective incorporation of a protein receptor site into patterned membranes. Thus Cremer et al. explicitly

disclose arrays of adjacent membrane corrals wherein a solid corral is utilized (i.e. microtiter well format).

However, Boxer does not explicitly teach different membrane proteins which are selected dopants that are different from at least one other corral.

For present claims 7-12, 14-18, 20, and 26, Grakoui et al. (please refer to the entire publication particularly the abstract; p. 221, para 1; p. 226, note 14) teach T cell activation mediated by adhesion molecules, wherein T cell antigen receptors interact with ligands to form major histocompatibility molecules-peptide complexes. In addition, Grakoui et al. (see pp. 221, para 7) teach a T cell activating system wherein the antigen presenting cell is replaced with planar bilayers containing fluorescently labeled MHC-peptide and ICAM-1. Furthermore, Grakoui et al. (see p. 226, Fig. 6) teach LFA as a membrane protein involved in cell adhesion. Thus, Grakoui et al. teach supported membranes displaying different specific proteins including MHC and ICAM that are effective artificial cell surfaces for adhesion with living cells. In addition, it is noted that Grakoui et al. is reference number 34 of Boxer (see page 706 of Boxer).

It would have been *prima facie* obvious, at the time the invention was made, for one of ordinary skill in the art to have made and used a method for screening living cell adhesion comprising an array of adjacent membrane corrals, wherein the corrals contain lipid bilayer membranes above an aqueous layer, wherein said lipid bilayer membranes in each of said corrals are doped with one or more dopants to form a doped lipid bilayer membrane, said dopants being membrane proteins.

One of ordinary skill in the art would have been motivated to make and use methods comprising arrays of adjacent membrane corrals and wherein the membrane protein dopants

which are selected are different the dopants from at least one other corral because Cremer et al. teaches the use of arrays of corralled lipid bilayers in screening assays and because Grakoui et al. teach the use of supported membranes displaying different membrane protein as effective artificial surfaces.

Arguments and Response

7. Applicants' arguments directed to the rejection under 35 USC 103 (a) as being unpatentable over Boxer, Cremer et al., and Grakoui et al. for claims 7-12, 14-18, 20, and 26 were considered but are not persuasive for the following reasons.

Applicants contend that Grakoui et al. is utilized as an inherency reference, Cremer et al. does not teach "adjacent membrane corrals", and that since Grakoui et al. does not teach "adjacent membrane corrals", the references can not be utilized for the limitation of "membrane proteins used as dopants from at least one other corral" (i.e. assumed that this is referring to the limitation in the present claims of "wherein the dopants selected in each corral is different form at least one adjacent corral").

Applicants' arguments are not convincing since the teachings of Boxer, Cremer et al., and Grakoui et al. render the method of the instant claims *prima facie* obvious. Grakoui et al. is not utilized as inherency reference in the present rejection, but as a secondary reference to provide support for the limitation not taught by Boxer in the prior art.

Regarding the "adjacent membrane corrals", Boxer teaches fibronectin grids utilized to corral supported membranes and pre-patterned barriers (see Figures 2 and 4). In addition, Cremer et al. teach arrays of supported membranes in a microtiter well format (see page 708 of Boxer et al. referring to reference number 38 which is Cremer et al. and see Figures 2-4 of Cremer et al.).

In addition applicants contend that the presently claimed invention utilizes a corral which is a barrier on a flat surface which applicants state that the glass wells taught by Cremer et al. are not. However, it is noted that paragraph 47 of the present specification defines corral as "a region where a membrane may be placed on membrane compatible material, which is enclosed by a perimeter of barrier material" and defines barrier material at paragraph 45 as "a material used to confine a bilayer in a bounded region, or corral…wells". Therefore, the glass wells taught by Cremer et al. meet the limitations of "adjacent membrane corrals as presently defined by applicants in the present specification.

Grakoui et al. teach MHC-peptide and ICAM-1 anchored to different sections of the bilayer (see page 221). In addition, Boxer et al. discusses utilizing the lipid bilayer membranes supported on glass substrate for tethering, analyzing motion on supported membranes, cell interaction, etc. (see pages 705-706) wherein different molecules are added to the lipid bilayer to facilitate analysis of different moelcules in a defined space (i.e. corral, etc.) in a high-throughput manner (see pages 707-708).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The claims would have been obvious because a particular known technique (i.e. high throughput analysis of several different molecules at the same time) was recognized as part of the ordinary capabilities of one skilled in the art. See *KSR International Co. v. Teleflex Inc.*, 82 USPQ 2d 1385 (U.S. 2007).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Future Communications

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMBER D. STEELE whose telephone number is (571)272-5538. The examiner can normally be reached on Monday through Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached on 571-272-0951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Amber D. Steele/
Primary Examiner, Art Unit 1639

August 3, 2009